



University Press Cambridge.

BORNEAN DRAGONFLIES.

4. Contributions to a Study of the Dragonfly Fauna of Borneo.—Part II. The Gomphinae and Chlorogomphinae. By F. F. LAIDLAW, M.A., F.Z.S.

[Received October 18, 1913: Read February 17, 1914.]

(Plate I.*)

	INDEX.	Page
Structure:		
Venation of <i>Orogomphus</i>		59
Geographical Distribution:		
Gomphinae and Chlorogomphinae of Borneo.....		51
Systematic:		
<i>Ictinus acutus</i> , sp. n.		51
<i>Burmagomphus vermiculatus</i> (Martin), <i>insularis</i> subsp. n.....		55
<i>Heterogomphus icterops</i> Martin, <i>borneensis</i> subsp. n. ?		57

Introductory remarks.—I have dealt at some length with the venation of the various species discussed below, more especially with the species belonging to the Chlorogomphinae; chiefly because all of them, and especially the latter, are very rare in collections, and because they are of particular systematic interest to the student of the Odonata.

With regard to the distribution of these members of the Dragonfly fauna, too little is known to admit of dogmatic statements or even of useful discussion. The genera which seem to be essentially characteristic of the Great Sunda Islands are *Macrogomphus* and *Microgomphus*, the latter unknown beyond their limits; all the other genera here recorded have a wide distribution in the Orient, and in the case of *Ictinus* beyond it. At the same time the Gomphine fauna of Tropical Asia is as sharply characterized as that of any other quarter of the earth.

ICTINUS ACUTUS, sp. n. (Selys nom.) (Pl. I. fig. 1.)

2 ♂♂. Baram, Oct. 1910.

Length of abdomen 45 mm. + 3 mm.; hind wing 36 mm.; pterostigma 5 mm.

Venation:—

An.n. $\frac{19 \text{ or } 20}{14 \text{ or } 15}$; Pn.n. $\frac{13 \text{ or } 14}{15}$; t. $\frac{3-4\text{-celled}}{3\text{-celled}}$; ti. $\frac{3 \text{ celled}}{1.2.2.3\text{-celled}}$; supr.t. $\frac{2}{2}$.

Belongs to the group *I. decoratus* de Selys.

Wings tinged with brown; orange at the base—in the fore wing for about one-third the length of the median space, but excluding the cubital space; in the hind wing almost up to the arculus. Pterostigma brown.

Head: Upper lip yellow, edged with black, the black reaching

* For explanation of the Plate see p. 63.

the base of the lip in the middle line; rhinarium yellow, marked below with a transverse black line. Nasus and frons brownish black; the former has a small round yellow spot on either side, the latter carries a pair of transverse yellow spots at its summit, these are separated narrowly in the middle line by black. Vertex and occiput entirely brownish black.

Prothorax very dark brown, its under surface and base of the prothoracic limbs paler.

Thorax rich chestnut-brown, marked with yellow as follows:—A mesothoracic half-collar divided by the black median dorsal carina; a dorsal stripe on either side, incomplete below, and an antehumeral stripe constricted at its middle; a narrow band on the mesepimeron and a second band, likewise narrow, on the metepisternum. Nearly the whole metepimeron is yellow, its posterior border narrowly marked with black, whilst the metasternum is entirely black.

Legs: Femora dark brown, the first pair with a narrow internal stripe; tibiæ and tarsi black.

Abdomen largely black, segments 1, 2 brown below and at the sides, auricles brown, 2 with a yellow dorsal band narrowing to a point at the apex of the segment; 3, 4, 5, 6 black, each with a small basal yellow mark dorsally, which is triangular in shape with its apex directed backwards (in the more adult of the two specimens these markings are of a brown colour rather than yellow). Anterior third of 7 yellow dorsally, 8, 9, 10 largely brown at the sides; the distal half of 10 is also brown dorsally; laminae of 8 black.

Anal appendages black; upper pair fully equal in length to 9, 10 together, curved inwards a little and crossing each other like the blades of scissors. Each bears a strong sharp spine on its outer margin, rising at the junction of the inner and middle third of its length, and the inner margin of each is finely serrated near its apex. Lower appendage very short, almost concealed by the anal tubercle, abruptly truncate, with a small hooked spur on either side.

This fine form is well characterized by the anal appendages, which are unlike those of any of the described species. The type-specimen has been examined by M. René Martin, who has very kindly informed me that it is identical with an example in the de Selys collection labelled *I. acutus*, which has not been described.

(The type is in the British Museum; co-type, Sarawak Museum.)

**ICTINUS DECORATUS* de Selys.

Ictinus decoratus Selys, Hagen, Monogr. Gomph. p. 273, pl. 14. fig. 4; Kirby, Cat. Odonata, p. 77; Krüger, Stettin. Entom. Zeitg.

* Species marked with an asterisk are those of which I have not received examples from Mr. Moulton.

1898, p. 315; Williamson, "Gomph. etc. of Burma," Proc. U.S. Nat. Mus. xxxiii. 1907, p. 279; Martin, Mission Pavie, p. 14 (sep.) (1904).

Recorded from Borneo (*Martin*), Sumatra (*Krüger*), Java (*Selys*), and Tonkin (*Martin*).

ICTINUS MELÆNOPS de Selys.

Ictinus melænops Selys, Hagen, Monogr. Gomph., pp. 532, 686, pl. 15. fig. 1; Selys, Addit. Synops. Gomph., Bull. Acad. Roy. Belg. 2. vii. 1859, p. 548; Karsch, Entom. Nachr. xvii. 1891, p. 244; Kirby, Cat. p. 77; Martin, Mission Pavie, p. 14 (sep.) (1904); Williamson, loc. cit. p. 280, figs. 7, 8, 29; Ris, Ann. Soc. Entom. Belg. lv. 1911, p. 239.

Ictinus melænops, race *sumatranus*, Krüger, Stettin. Entom. Zeitg. 1898, p. 315.

I have examined one female taken at Kuching in December 1899 (Sarawak Museum Collection).

The species is recorded also from Sumatra (*Karsch*, *Krüger*) and Malacca (*Martin*), Cambodia and Tonkin (*Martin*).

*GOMPHIDIA MACLACHLANI de Selys.

Gomphidia maclachlani de Selys, 2^{me} Addit. Synops. Gomph., Bull. Acad. Roy. Belg. 2. xxviii. 1869, p. 767; Kirby, Cat. p. 76; Krüger, Stettin. Entom. Zeitg. 1898, p. 314; Martin, Mission Pavie, p. 14 (sep.); Williamson, loc. cit. pp. 281-282.

Recorded from Borneo (*Selys*), Sumatra (*Krüger*), Tonkin and Anam (*Martin*).

*GOMPHIDIA KIRSCHI de Selys.

Gomphidia kirschi Selys, 4^{me} Addit. Synops. Gomph., Bull. Acad. Roy. Belg. 2. xlvi. 1878, p. 673; id., Anal. Soc. Españ. de Hist. Nat. xi. 1882, p. 18; Kirby, Cat. p. 76; Martin, Mission Pavie, p. 14 (sep.); Williamson, loc. cit. p. 283.

Recorded from the Philippine Is. (*Selys*), Borneo (*Selys*), and Tonkin (*Martin*).

SIEBOLDIUS JAPONICUS de Selys.

Sieboldius japonicus Selys, Hagen, Monogr. Gomph. p. 224, pl. 13. fig. 3; Kirby, Cat. p. 76; Williamson, loc. cit. p. 285, fig. 11.

Sieboldius grandis Krüger, Stettin. Entom. Zeitg. 1898, pp. 311-314; Laidlaw, Proc. Zool. Soc. Lond. 1902, i. p. 81, pl. vi. fig. 33 a.

I have examined a male of this fine species, collected by Mr. Moulton. It agreed closely with the male taken by myself in Perak. Williamson is probably correct in regarding Krüger's species as not distinct from that of de Selys.

Ranges from Japan to Borneo.

*MACROGOMPHUS ALBARDÆ de Selys.

Macrogomphus albardæ Selys, 4^{me} Addit. Synops. Gomph., loc. cit. pp. 416-418; id., Ann. Mus. Civ. Genova, xxvii. 1889, p. 469; Kirby, Cat. p. 63; Karsch, Entom. Nachr. xvii. 1891, p. 224; Krüger, Stettin. Entom. Zeitg. 1898, p. 300; Williamson, loc. cit. p. 289; Ris, Ann. Soc. Entom. Belg. lv. 1911, p. 238, figs. 7, 8.

Recorded from Sumatra (*Selys*) and Borneo (*Ris*).

MACROGOMPHUS DECEMLINEATUS de Selys.

Macrogomphus decemlineatus Selys, 4^{me} Addit. Synops. Gomph. pp. 418-419; id., Ann. Mus. Civ. Genova, xxvii. 1889, p. 469; Kirby, Cat. p. 63; Krüger, Stettin. Entom. Zeitg. 1898, p. 203; Williamson, loc. cit. p. 289.

2 ♂♂ from Kuching, May 1896 (Sarawak Museum Collection).

Recorded from Sumatra (*Selys*) and Borneo (*Selys*).

*MACROGOMPHUS QUADRATUS de Selys.

Macrogomphus quadratus Selys, 4^{me} Addit. Synops. Gomph. p. 415; id., Ann. Soc. Entom. Belg. xxvii. 1884, p. x; id., Ann. Mus. Civ. Genova. xxvii. 1889, p. 469; MacLachlan, Ann. Soc. Entom. Belg. xxviii. 1884, p. vii; Förster, Ann. Soc. Entom. Belg. xliii. 1889, p. 65; Kirby, Cat. p. 63; Krüger, Stettin. Entom. Zeitg. 1898, pp. 296-297; Williamson, loc. cit. p. 287.

From Borneo (*Selys*) and Sumatra (*Selys*).

MICROGOMPHUS CHELIFER de Selys.

Microgomphus chelifer Selys, Hagen, Monogr. Gomph. p. 364; Selys, Addit. Synops. Gomph. p. 533; Kirby, Cat. p. 63; Krüger, Stettin. Entom. Zeitg. 1898, p. 302; Laidlaw, Proc. Zool. Soc. Lond. 1902, i. p. 79; Williamson, loc. cit. pp. 295-296, figs. 21, 22.

1 ♂. Saribas, 1910.

A new record for Borneo. Known from Malacca (*Selys*) and Sumatra (*Krüger*).

*LEPTOGOMPHUS SEMPERI de Selys.

Leptogomphus semperi Selys, 4^{me} Addit. Synops. Gomph. pp. 443-444; Martin, Mission Pavie, p. 11 (sep.); Kirby, Cat. p. 70; Williamson, loc. cit. pp. 292-293, fig. 17; Ris, Suppl. Entom. Deutsch., Entom. Mus. no. 1, 1912, p. 69.

Recorded from Borneo (*Martin*), Philippines (*Selys*), Tonkin (*Martin*).

LEPTOGOMPHUS WILLIAMSONI Laidlaw.

Leptogomphus williamsoni Laidlaw, Journ. Str. Br. R. Asiat. Soc. [no. 63] Dec. 1912, p. 94, figs. 1, 2.

This species belongs to section B of the genus as defined by Ris.

It has the basal subcostal nerve of the second series present on all four wings; the hamuli are large and the "Penischale" is small. The upper pair of anal appendages are very similar to those figured by Ris for *L. perforatus* Ris and *L. sauteri* Ris.

It is characterized by the possession of a single row of cells only in the whole anal area, and by the rather striking yellow spot on the dorsum of segment 10 of the abdomen. (For figures of genital appendage of this species see Laidlaw, *loc. cit.*)

The type ♂ is in the British Museum.

[LEPTOGOMPHUS KELANTANENSIS (Laidlaw).*†

Leptogomphus kelantanensis Williamson, *loc. cit.* p. 291 (1907).

Gomphus consobrinus Laidlaw (nom. preoccup.), *Proc. Zool. Soc. Lond.* 1902, i. p. 80, pl. v. fig. 5.

Gomphus kelantanensis Laidlaw, *Proc. Zool. Soc. Lond.* 1902, ii. p. 382 (footnote).

This species belongs to section A of the genus, according to Dr. Ris' arrangement. There is no basal postcostal of the second series, the hamuli are small, and the "Penischale" large. The single male captured is fully adult and its sober colouring is excellently shown in Mr. Wilson's figure, where the venational characters are also satisfactorily exhibited (*Proc. Zool. Soc. Lond.* 1902, pl. v. fig. 5).

Like *L. williamsoni*, this species has its anal area composed of a single row of cells. The upper anal appendages are rather small, with a single well-marked but small tooth on their outer side at about the middle of their length; the appendage terminates in a fine upturned point; each extremity of the lower appendage is hooked upwards rather abruptly at its termination.

The type ♂ is in the Zoological Museum of the University of Cambridge.]

BURMAGOMPHUS VERMICULATUS (Martin), subsp. INSULARIS, nov. (Pl. I. fig. 2.)

Gomphus vermiculatus Martin, *Mission Pavie*, p. 11 (sep.).

Burmagomphus vermiculatus Williamson (nec Martin?), *loc. cit.* pp. 298-301, figs. 27, 28, 29 (10); (Ris, *Tijdschrift v. Entom.*, Deel lv. 1912, p. 164).

1 ♂.

An interesting addition to the fauna of Borneo. In size it agrees closely with Williamson's specimens from Burnah, in most other respects it appears to approach the individuals described by Martin from Tonkin. I am disposed to believe that Williamson's examples represent a species distinct from the true *B. vermiculatus* of Martin; but cannot be certain on the point without a good supply of material from the two localities.

In any case the present specimen agrees rather with Martin's specimen than with those described by Williamson.

* Not recorded from Borneo.

† [The parentheses around the names of authors placed after scientific names in this paper are used in accordance with Article 23 of the International Rules of Nomenclature. (*Proc. 7th Int. Cong. Boston, 1907, p. 44 (1912).*—EDITOR.)

The individual here recorded shows well the generic characters tabulated by Williamson. The wing characters are almost identical with those shown in his figure (*loc. cit.* fig. 27). A difference which may be merely individual, but if not, one that I should regard as of specific importance, is that the anal triangle of both hind wings of the Bornean specimen is divided into two cells only, by a cross-nerve running parallel to the long axis of the wing. Williamson's figure might well have been taken from this representative specimen from Borneo excepting for this, for the difference in the number of antenodal and postnodal nerves, and for the fact that in the Burmese specimen figured the area included between Cu_2 and A_1 in the hind wing is a little shorter and broader than in the individual under consideration; and, lastly, for a slight difference evident in the relative size of the pterostigmata.

Details are as follows:—

Length of abdomen 28 mm.

Length of hind wing 28 mm.

Venation:—

	13—12	9—9
An.n.	—	—
	9—8	8—10

; Pn.n.

Pterostigma a shade longer and narrower than in the type of the genus, covering 4 cells in the front wing.

Head: Anterior surfaces black, with a rectangular yellow mark on either side of the upper lip, and a yellow spot at each angle of the lip; a transverse yellow band along the crest of the frons divided by a fine median line into two lateral halves.

Thorax black above, marked with a yellow mesothoracic half-collar interrupted in the middle line, tapering laterally. A pair of narrow dorsal stripes of the same colour, not reaching to the base of the femora; a very small superior antehumeral spot on either side. Laterally, from immediately behind the humeral suture, the thorax is yellow marked with a black line which rises below at the level of the first lateral suture, includes the stigma, curves backward to join a second black line which follows the course of the second lateral suture, but bifurcates above to enclose a small yellow space.

Abdomen black marked with yellow; 1 with a lateral spot on either side; 2 with a dorsal triangle, its apex directed backwards covering the first two-thirds of the segment, sides including the auricles also yellow; 3–7 each with a fine yellow, basal, transverse mark dorsally, occupying about the first eighth of the length of the segment; 8 entirely black; 9 with the trace of a yellow ring at its apex; 10 entirely black.

Legs black, the first pair of femora yellow on their inner side, the second pair with a small yellow mark on the same surface distally.

Appendages black. The genital structures on 2 are almost identical with those shown in Williamson's figure (Williamson, *loc. cit.* fig. 28 c), the second pair of hamuli not quite so prominent.

Anal appendages relatively shorter, the limbs of the lower one stouter and less divaricate (*loc. cit.* fig. 28, A, B. *Cf.* also Martin, quoted by Williamson, *loc. cit.* p. 301).

[*Ris loc. cit.* has recently described a species from Java which he refers to this genus under the name *B. jacobsoni*. This species differs from *B. vermiculatus* in the colouring of the thorax, in the shape of the genital hamuli, and of the anal appendages. It is also a little larger.

He is inclined to regard the form described by Williamson as distinct from the true *B. vermiculatus* of Martin.]

The specimen described above is deposited in the British Museum.

HETEROGOMPHUS ICTEROPS Martin, subsp. BORNEENSIS, nov.? (Pl. I. fig. 3.)

Heterogomphus icterops Martin, Mission Pavie, p. 9 (sep.); id., Bull. Mus. d'Hist. Nat. 1902, no. 7, p. 506; Williamson, *loc. cit.* p. 316.

1 ♂. Matang Rd. 28:3:10.

Length of abdomen (without appendages) 51 mm.

Length of hind wing 45 mm.

The cross-nerves on the wings on the right side of the single specimen are highly irregular; it would seem as though that during development those wings had suffered from a "cell-storm" which did not interfere with the general symmetry of the wings nor yet largely with their main structural features, but considerably disturbed the number and arrangement of the cross-nerves, especially on and near the costal spaces.

Martin's description of the species, based on an example in de Selys' collection, from Java, is very brief. Hence, without actually confronting the specimens, it is impossible to say how far the Bornean form here described is distinct.

Venation:—

16—22!	13—13
An.n. ———	Pn.n. ———
13—15!	12—15

In addition, there are several incomplete antenodals on the right fore wing, and two cross-nerves in the submedian space, whilst there is also a single cross-nerve in the supra-triangle of the hind wing of that side.

The pterostigma has a well-developed brace on all four wings.

Head: With the exception of the vertex and occiput which are very dark brown, and of the eyes which in the dead specimen are brown, the head is light brownish yellow in colour; the *prothorax* is brown, lighter at the sides.

The *thorax* is yellow marked with brown as follows:—A broad humeral band continuous above with the brown of the antealar sinuses and below with a narrow stripe running along the anterior margin of the mesothorax; a broad band runs down along the mid-dorsal carina, narrowing below and just meeting the posterior

margin of the mesothoracic half-collar, but not coalescing with the brown stripe along its anterior border. Laterally, there is a narrow stripe along the second lateral suture continuous over the back.

Legs: Femora red-brown, tibiæ and distal parts black.

Abdomen rather pale brown, each segment, excepting the first two and the last two, having a black ring distally. 1, 2 are largely yellow at the sides and have yellow markings dorsally; in 1 this is confined to the posterior half of the segment, except for a very fine line extending forwards to the anterior end of the segment in the mid-dorsal line. In 2 the dorsal yellow colour takes the form of an irregular longitudinal band. On 7 the brown of the anterior three-fifths of the dorsum of the segment carries a square yellow mark. 9, 10 are unmarked, 9 dark brown, 10 lighter. The latter segment is very short, not half the length of 9.

Anal appendages light brown, the extreme points finely tipped with black. In general resembling those of *H. smithi* Selys, long and slender, the upper pair as long as 9, 10 together, the limbs of the lower appendage about four-fifths as long. The upper pair are straight, their tips hooked downwards to a very trifling extent. The limbs of the lower appendage are also straight, except at their apices which have a slight curving upwards, whilst each carries at about one-sixth of its length from the apex a small sharply-pointed spur, directed inwards at a right angle to the axis of the limb.

This large and handsome insect represents a genus new to the fauna of Borneo, and is one of the most interesting of Mr. Moulton's many "finds" amongst the Odonata of the island.

The specimen will be deposited in the British Museum.

Subfamily CHLOROGOMPHINÆ.

In describing the venation of the species of this subfamily, I use the term "anal loop" to indicate the very definite area lying below the cubital space bounded by branches of the anal vein and by $An_1 + Cu_2$. The name is used in the same sense by Needham (Proc. U.S. Nat. Mus. xxvi. p. 733) for *Chlorogomphus*. The loop, as well as the area between Cu_2 and An_1 in the hind wing, seems liable to considerable individual variation in the genus.

I have figured the penis of *Orogomphus dyak* (Pl. I. fig. 7), and would call attention to its close resemblance to that of *Cordulegaster*. The structure of the antennæ is also well worth remark.

Ris has noted the occurrence of tibial ridges in the males of this subfamily (Ris, Coll. Zool. Selys, ix. p. 9, 1909). These ridges, so far as one can judge, are scarcely adaptive structures, and their presence would appear to me to indicate a real if remote relationship to the Corduliinæ.

OROGOMPHUS DYAK Laidlaw. (Pl. I. figs. 4-7.)

Orogomphus dyak Laidlaw, Journ. Straits Branch R. Asiatic Soc. 1910, p. 121 (1911).

♂ ♂.

Venation :—

The triangles of the hind wings have their upper and outer sides subequal, the inner side distinctly shorter, resembling that of the fore wing.

Formula :—

	Anal loop of hind wing.	An.n.	Pn.n.	M.	Cu.	t. (cells).	suprat.
♂ ₁ (type)...	$\frac{7-7}{7-7}$	$\frac{21-21}{18-16}$	$\frac{11-12}{15-15}$	$\frac{3-3}{3-3}$	$\frac{7-7}{6-7}$	$\frac{1-1}{1-1}$	$\frac{5-5}{5-4}$
♂ ₂	$\frac{8-6}{8-6}$	$\frac{21-24}{16-18}$	$\frac{11-11}{12-13}$	$\frac{3-3}{3-3}$	$\frac{8-6}{7-7}$	$\frac{1-1}{1-1}$	$\frac{5-4}{5-4}$

The wings have a slightly yellow tinge, most marked when seen with reflected light, between Cu and M₂ proximal to the pterostigma, especially in the specimen marked ♂₂.

Head: Labium brownish yellow, labrum black; rhinarium dark brown, nasus bright lemon-yellow; frons black, but with a fine yellow line along the crest which is surmounted by a number of fine black hairs, not so numerous as in *O. atkinsoni*. Vertex and occiput jet-black. Ocelli and antennæ as in *O. atkinsoni*.

Prothorax black above, the posterior margin edged with yellow, and the same colour on the sides.

Thorax relatively small, black, marked with yellow lines. On either side is a narrow dorsal thoracic stripe, widening a little at its extremities, touching the mesothoracic half-collar below, a little curved with its convexity inwards; followed by a broader antehumeral stripe. There is a narrow stripe laterally on the metepisternum, and the metepimeron is finely edged with yellow; the under surfaces are brownish, and there is a yellow interalar spot and a fine yellow spot on each alar sinus.

Legs black, coxæ and base of under side of femora of the first pair yellow.

Abdomen black, marked with golden yellow as follows:—A fine transverse line at the distal end of 1; the distal half of 2, but this is largely obscured by a broad transverse black band lying within it; the auricles are yellow. There is a very small pair of lateral spots about the middle of 3, and a small terminal transverse spot on the same segment. On 6 there is a terminal ring, occupying about the last one-eighth of the length of the segment.

The anal appendages are black, rather longer than 10. They resemble generally those of *O. splendidus* as figured by Dr. Ris, but differ in detail; the upper pair is much slenderer than in that species and has the ventral teeth much smaller; the lower

appendage is much less deeply cleft and its limbs are pointed, not truncate.

♀ ♀. Matang Rd.

In details of venation these two specimens differ considerably from one another.

Formula :—

	Anal loop (hind wing).	An.n.	Pn.n.	M.	Cu.	t. (cells).	suprat.
A (type) ...	10—10	22—23	12—11	3—3	8—7	2—2	5—6
		19—20	14—14	3—4	9—9	3—3	6—6
B	14—14	22—22	12—10	3—3	8—9	2—2	5—5
		20—20	14—15	4—3	9—9	3—3	6—5

The difference is most marked in the anal area. Not only is the number of cells here greater in specimen B than in A, but there is also a marked difference in the number of cells lying between the fork of Cu_2 : in A these cells lie in two rows, and, excluding the marginal cells, are 9 in number; in B, on the other hand, they are disposed in three rows and number 13 and 11.

As in the males the inner side of the triangle of the hinder wings is the shorter, though in this sex the difference is not very strongly marked.

The type-specimen, A, evidently the more mature, has the wings suffused with a golden-brown tinge throughout; most marked at the bases and apices. The colour is richest about the periphery of the cell, the central part, especially at the apices of the wings, being often distinctly paler. B, the younger specimen, has the wings almost colourless, but with a very faint yellow tinge between the nodus and pterostigma extending down the wing as far as M_2 .

The colouring of the head, thorax, and body scarcely differs from that found in the male.

The following are the principal measurements:—

Length of abdomen: ♂ 53 mm., ♀ 56 mm.

Length of hind wing: ♂ 38 mm., ♀ 42 mm.; breadth ♀ 14 mm.

In both sexes a basal postcostal nerve is present.

Type ♂ & ♀ will be deposited in the British Museum.

Orogomphus splendidus de Selys. (Pl. I. fig. 8.)

Orogomphus splendidus Selys, 4^{me} Addition Synops. Gomph. p. 681 (1878); id. Anal. Soc. Españ. Hist. Nat. xi. p. 16 (1882); Kirby, Cat. Odonata, p. 79; Martin, Mission Pavie, p. 14 (sep.) (1904); Williamson, loc. cit. p. 278 (1907); Ris, Suppl. Entom. Deutsch., Ent. Mus. No. 1, 1912, pp. 77, 79, fig. 15 a, b, Taf. iii. figs. 1–6, Taf. v. fig. 5.

Mr. Moulton has forwarded me two female specimens presumably belonging to one and the same species though showing

some rather marked differences in venation. These two specimens are, I believe, to be referred to *O. splendidus* de Selys. It is evident from Ris' study of the venation of three males belonging to this species, that there is a considerable amount of individual variation to be looked for, and the agreement between them and de Selys' type is close in other respects.

One of the specimens has been returned to the Sarawak Museum, and unfortunately I did not before returning it make full notes of the venational formula for both pairs of wings.

	Anal loop (hind wing).	An.n.	Pn.n.	M.	Cu.	t. (cells).	suprat.
1.	—	—26	—13	—2	—9	—3	—5
	—20	—19	—16	—3	—8	—3	—4
2.	—	26—25	14—13	3—2	8—8	2—2	5—5
	13—14	20—18	17—18	2—2	8—8	3—3	5—4
(de Selys' type.)	—	23—25	14	3	6—7	3	5—6
	—	—	—	—	—	—	—

The most marked difference between Mr. Moulton's specimens is in the anal loop. In Ris' photograph of the type ♂ from Kosempo that area contains 19 cells.

Further, in Moulton's specimens in 1. there are only 2 rows of cells in the space between Cu_2 and A_1 almost to the margin of the wing, whilst in 2. there are on the right side 4 rows and on the left 6 rows; in the type male there appear to be 6 rows.

The wings of the Bornean specimens are coloured as follows:—Base and apices of wings suffused with bright golden brown, on the fore wing reaching to the inner angle of the triangle, and on the hind wing one cell beyond the arculus; at the apices the colour begins rather nearer to the pterostigma than to the nodus, and is fainter on the anal margin of the wing.

The basal postcostal nerve is absent in these female specimens; it is present in the male figured by Dr. Ris.

The colouring of the head, thorax, and body is as described for the male.

The chief measurements are:—

Length of abdomen circa 56 mm.

Length of hind wing 48 mm.; breadth 17.5 mm.

[*Orogomphus atkinsoni* de Selys.*

Orogomphus atkinsoni Selys, 4^{me} Add. Synops. Gomph. p. 682 (1878); Kirby, Cat. p. 79; Selys, Ann. Mus. Civ. Genova, 2. x. (p. 49 sep.) (1891); Williamson, loc. cit. p. 278, figs. 5, 6 (1907).

1 ♀, Bhowali.

(Indian Forest Research Institute per Dr. Imms.)

* Not recorded from Borneo.

The following is an account of the single specimen of this species that I have been able to examine :—

Venation : The triangle of the hind wing, as in the specimen figured by Williamson from the de Selys collection, has its upper and inner sides subequal, distinctly shorter than is the outer side. The male, judging from Williamson's figure, has the inner side distinctly shorter than the other two sides, so that the apex of the triangle is at its outer angle.

The triangles of the hind wings in my specimen are bisected in each wing by a nerve running from its inner angle to the middle of the outer side, whilst in de Selys' specimen, on the left side at any rate, the triangle is divided into 3 cells. Otherwise the venation agrees in detail between the two specimens. There is no basal subcostal nerve.

The wing-formula of the two female examples is as follows :—

	Anal loop of hind wing.	An.n.	Pn.n.	M.	Cu.	t. (cells).	suprat.
Bhowali, Kumaon.....	10—10	14—13	12—12	1—1	6—6	2—2	3—3
Bengal. Coll. Selys. } (From Williamson's figure.)	12—	15—	13 (?)	1—	8—	3—	3 (?) 4

The wing-formula of the male is

Bengal. Coll. Selys. } (From Williamson's figure.)	9—	13—	14—	1—	5—	2—	2—
---	----	-----	-----	----	----	----	----

In the specimen from Bhowali the extreme base of both pairs of wings has a golden tinge, this does not extend so far as the first cross-nerves.

Head : Labium dull brown. Labrum brown edged with black. Rhinarium dark brown; nasus and frons brownish yellow, the frons at its vertex carries a line of fine black hairs, and is as high as the summit of the occiput. In front it is rather flattened. Vertex black; the ocelli lie in a slightly curved line, the median one being placed a little in advance of the lateral pair.

The antennæ have the second joint relatively very large and stout, cylindrical in shape, and equal in length to the distal part of the organ which consists of five or six slender joints. The large brown eyes meet at a point; and the occiput is small, dark brown in colour, with a fringe of fine yellow hairs.

The *prothorax* is small, dark brown above, its posterior margin lemon-yellow.

The *thorax* is relatively small, black, and thickly covered with silky brown hairs; there is a pair of dorsal humeral stripes, rather wedge-shaped, with their apices directed forwards, not quite touching the margin, of a bright lemon-yellow colour. Two broad bands of the same colour lie on either side of the thorax,

the first on the mesepimeron, the second, the broader, on the metepimeron; the under surfaces are brown, and there is a yellow spot on the interalar sinus.

The *legs* are black, the coxæ and base of under surface of the first pair are lemon-yellow.

Abdomen: Segments 1, 2, 3 and 5, 6, 7 a little dilated. Black with golden-yellow markings as follows:—A fine transverse band at the distal end of the dorsum of 1. The terminal half of 2, but this band carries a black median dorsal spot, which has rather the shape of a three-pointed ivy-leaf directed backwards, the yellow band is also incomplete below. 3, 4, 5 with a pair of lateral spots at their middle, and a terminal half-circle, interrupted by the mid-dorsal carina. 6, 7, 8, 9 with the terminal half-circle only.

Measurements of specimen from Bhowali:—

Length of abdomen 57 mm.; hind wing 42.5 mm.

Length of pterostigma 3 mm.; width of head 9 mm.

Breadth of wing 15 mm.]

NOTE.—I have omitted from the list *Macrogomphus abnormis* de Selys as its provenance is doubtful.

EXPLANATION OF THE PLATE.

- Fig. 1. *Ictinus acutus*, sp. n. Superior anal appendages of male, seen from above.
 2. *Burmagomphus vermiculatus* (Martin), *insularis* subsp. n. Thoracic colour pattern (diagrammatic).
 3. *Heterogomphus icterops* Martin, *borneensis* subsp. n. ?
 4. *Orogomphus dyak* Laidlaw. ♂, wings of left side.
 5. " " " ♀, wings of left side.
 6. " " " ♂, anal appendages.
 7. " " " ♂, penis and vesicle.
 8. *Orogomphus splendidus* de Selys. ♀, wings of left side.

(For the photographs from which figs. 3, 4, 5, and 8 are reproduced I am indebted to the kindness of Messrs. F. W. & H. Campion.)